

Claims

1. A liquid dispensing system for dispensing liquid on a circuit board comprising:

a conveyor for transporting the circuit board along a direction of travel
5 to a working position;

a liquid dispenser mounted for dispensing liquid on the circuit board
when the circuit board is in the working position;

a heater mounted under the conveyor when the circuit board is in the
working position for heating the circuit board; and

10 a first elongated hollow tube mounted under the heater and having
holes oriented so that when a gas is introduced into the first tube, the gas is
directed upwardly through the holes, past the heater, and toward the circuit
board.

15 2. The system of claim 1, further comprising a second hollow tube
mounted parallel to the first tube and having holes oriented to direct a gas
through the holes upwardly past the heater and toward the circuit board.

20 3. The system of claim 2, wherein the conveyor has first and second
parallel rails elongated along a first direction, the rails being movable relative
to each other in a second direction transverse to the first direction, the first and
second tubes being coupled to move along the second direction with the rails.

25 4. The system of claim 3, further comprising a third hollow tube
mounted parallel with and between the first and second tubes.

30 5. The system of claim 4, wherein the heater includes a plurality of
elongated heating tubes mounted in parallel and extending transverse to the
direction of travel.

6. The system of claim 5, wherein the holes of the first tube are at
locations halfway between pairs of adjacent heating tubes.

7. The system of claims 1, further comprising an air supply coupled to each end of the first tube for providing air at each end.

5 8. The system of claim 1, wherein the first tube is made of black anodized aluminum.

9. The system of claim 1, wherein the heater includes a plurality of heating tubes mounted in parallel and extending transverse to the direction of travel.

10 10. The system of claim 9, wherein the holes of the first tube are at locations halfway between adjacent heating tubes.

11. The system of claim 1, further comprising a second hollow tube, wherein the heater includes a plurality of elongated heating tubes mounted in parallel and extending transverse to the direction of travel.

12. The system of claim 11, wherein the holes of the first tube are at locations halfway between pairs of adjacent heating tubes.

13. A system for conveying and heating a workpiece comprising:
a conveyor for transporting the workpiece along a direction of travel;
a heater mounted on one side of the conveyor for heating the workpiece;
and

25 a first hollow elongated tube mounted so that the heater is between the workpiece and the first tube, the first tube having a plurality of holes oriented so that when a gas is introduced into the first tube, the gas is directed through the holes, past the heater, and toward the workpiece.

30 14. The system of claim 13, further comprising a second hollow tube mounted parallel to the first tube and having holes oriented so that when a gas is introduced into the second tube, the gas is directed upwardly through the holes in the second tube, past the heater, and toward the circuit board.

15. The system of claim 14, wherein the conveyor has first and second parallel rails elongated along a first direction, the rails being movable relative to each other in a second direction transverse to the first direction, the first and second tubes being coupled to move along the second direction with the rails.

16. The system of claim 13, further comprising an air supply coupled to each end of the tube.

10 17. A system for heating a workpiece comprising:
a support for supporting the workpiece in a working position;
a heater mounted for heating one side of the workpiece; and
a first hollow elongated tube mounted so that the heater is between the
workpiece and the first tube, the first tube having a plurality of holes oriented
15 so that when a gas is introduced into the first tube, the gas is directed through the holes, past the heater, and toward the workpiece.

20 18. The system of claim 17, wherein the heater includes a plurality of parallel heating tubes and the hollow elongated tube is transverse to the heating tubes.

25 19. The system of claim 18, further comprising a second hollow elongated tube with holes, the second tube being mounted parallel to the first tube.

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